Examining ageing in the British cohort studies: measurement, research and access

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CLS webinar
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Aims

- Outline ‘ageing’ measures and data available in the CLS cohorts
- How to access ageing data in the CLS cohorts
- Highlight the types of ageing research that can be done using birth cohorts
- Understand how the British cohorts are a unique resource in the study of ageing
- Opportunity for Q&A
Ageing in the British cohorts

- Life course approach
- Captures early-life and major transitions
- Multi-disciplinary – breadth of areas across the life course: economic, health, social (predictors, outcomes, in unison)
- Repeated measures – across life/ life-stages
- Cross-generational
Centre for Longitudinal Studies (CLS)
current core studies

1958 National Child Development Study (NCDS)

1970 British Cohort Study (BCS70)

1989-90 Next Steps

2000-2 Millennium Cohort Study (MCS)
Study timelines and future 2020-2030

Year

Age

MCS (00/02)  Next Steps (89/90)  BCS70 (70)  NCDS (58)  NSHD (46)
### Example: NCDS A study of everyone born in one week in 1958 (GB)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>7</td>
<td>11</td>
<td>16</td>
<td>23</td>
<td>33</td>
<td>42</td>
<td>44</td>
<td>46</td>
<td>50</td>
<td>55</td>
<td>62/65</td>
<td></td>
</tr>
<tr>
<td>mother</td>
<td>parents</td>
<td>parents</td>
<td>cohort member / parents</td>
<td>cohort member</td>
<td>cohort member</td>
<td>cohort member</td>
<td>cohort member</td>
<td>cohort member</td>
<td>cohort member</td>
<td>cohort member</td>
<td>cohort member</td>
<td>Cohort member</td>
</tr>
<tr>
<td>school</td>
<td>school</td>
<td>school</td>
<td>children (1 in 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>medical exam</td>
<td>medical exam</td>
<td>medical exam</td>
<td>medical exam</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>Ht/Wt</td>
<td>biomedical</td>
</tr>
<tr>
<td>cognitive mental h.</td>
<td>cognitive mental h.</td>
<td>cognitive mental h.</td>
<td>mental h.</td>
<td>mental h.</td>
<td>mental h.</td>
<td>cognitive mental h.</td>
<td>cognitive mental h.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>area of residence (census)</td>
<td>area of residence (census)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>response rate</td>
<td>17,415</td>
<td>15,425</td>
<td>15,337</td>
<td>14,654</td>
<td>12,537</td>
<td>11,469</td>
<td>11,419</td>
<td>9,377</td>
<td>9,534</td>
<td>9,790</td>
<td>9,137</td>
<td>@8,000</td>
</tr>
</tbody>
</table>

**Main respondents:** mother, parents, school

**Others:** medical exam, Ht/Wt, blood - DNA biomedical

**Survey instruments:** cognitive mental h., mental h.

**Linked data:** area of residence (census), consent for health & economic records

**Response rate:** 17,415, 15,425, 15,337, 14,654, 12,537, 11,469, 11,419, 9,377, 9,534, 9,790, 9,137, @8,000
COVID-19 and serology surveys
Available via the UKDS (EUL)

COVID-19 surveys response

<table>
<thead>
<tr>
<th>Wave</th>
<th>NCDS</th>
<th>BCS70</th>
<th>Next Steps</th>
<th>MCS CMs</th>
<th>MCS parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wave 1</td>
<td>5,178</td>
<td>4,223</td>
<td>1,907</td>
<td>2,645</td>
<td>2,831</td>
</tr>
<tr>
<td>Wave 2</td>
<td>6,282</td>
<td>5,320</td>
<td>3,664</td>
<td>3,274</td>
<td>5,707</td>
</tr>
<tr>
<td>Wave 3</td>
<td>6,809</td>
<td>5,758</td>
<td>4,239</td>
<td>4,474</td>
<td>5,251</td>
</tr>
</tbody>
</table>

Serology survey response

<table>
<thead>
<tr>
<th>Invited</th>
<th>NCDS</th>
<th>BCS70</th>
<th>Next Steps</th>
<th>MCS CMs</th>
<th>MCS parents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invited</td>
<td>6,939</td>
<td>6,594</td>
<td>4,826</td>
<td>5,266</td>
<td>7,143</td>
</tr>
<tr>
<td>Consented</td>
<td>4,156</td>
<td>3,741</td>
<td>2,090</td>
<td>1,397</td>
<td>3,214</td>
</tr>
<tr>
<td>Blood sample returned</td>
<td>3,222</td>
<td>2,547</td>
<td>1,267</td>
<td>1,140</td>
<td>2,266</td>
</tr>
</tbody>
</table>

https://cls.ucl.ac.uk/covid-19-survey/

Serology Survey:
- Participants who took part in one of three COVID-19 Surveys were invited to provide a finger-prick blood sample
  - Two antibody tests conducted - N-assay and S-assay
    - N-assay more likely to identify naturally occurring antibodies through exposure to virus
    - S-assay more likely to identify antibodies occurring following vaccination
  - Same antibody tests conducted in multiple longitudinal studies including ALSPAC, USoc, ELSA, TwinsUK and NSHD (1946 cohort), funded by National Core Studies.

https://cls.ucl.ac.uk/covid-19-survey/covid-19-antibody-testing/
Genetic data

• New data access system (typically <1 month for a response, simple form; link).

• **NCDS**: Available, combined Arrays n: 6,312

• **BCS70**: Available, n: 5,598

• **Next Steps**: saliva collection completed for age 32, funding for DNA extraction and genotyping.

• **MCS**: Available, n: 20,257
  - Trios (cohort member, mother, father)
  More details:
  [https://cls-genetics.github.io/](https://cls-genetics.github.io/)

• In future:
  • Polygenic scores for multiple health / social phenotypes
  • Data for DNA methylation - derivation of multiple epigenetic clock measurements
### Linked administrative data in the cohorts

#### Health

<table>
<thead>
<tr>
<th>Country</th>
<th>Study</th>
<th>Data set</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>NCDS, BCS70, Next Steps, MCS</td>
<td>Hospital Episodes Statistics (HES)</td>
<td>Available at UKDS (e.g. link) via Secure Lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Admitted Patient Care (APC)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Critical Care (CC) – linked to APC</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Accident &amp; Emergency (A&amp;E)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Outpatient Care (OP)</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>NCDS, BCS70, MCS</td>
<td>Scottish Medical Records (SMR)</td>
<td>Available at UKDS (e.g. link) via Secure Lab</td>
</tr>
<tr>
<td></td>
<td>NCDS, BCS70 only</td>
<td>• Inpatient, Outpatient, Prescribing information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MCS only</td>
<td>• Maternity inpatient</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Immunisation (SRS), Child Health Review, Birth and neonatal records</td>
<td></td>
</tr>
<tr>
<td>Wales</td>
<td>MCS</td>
<td>• Health data assets from SAIL Databank (e.g. emergency department, outpatient) up to age 14 and for CM’s parents</td>
<td>Available at Secure Anonymised Information Linkage (SAIL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hospitalisations &amp; no. of diagnoses from ICD-10 &lt; age 11</td>
<td>Available at UKDS via Secure Lab</td>
</tr>
</tbody>
</table>

#### Education

<table>
<thead>
<tr>
<th>Country</th>
<th>Study</th>
<th>Data set</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>Next steps, MCS Next Steps</td>
<td>KS1 to KS4</td>
<td>Available at UKDS (e.g. link) via Secure Lab</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• KS5, Individual Learner records Company (SLC)</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>MCS</td>
<td>NPD KS1</td>
<td></td>
</tr>
<tr>
<td>Wales</td>
<td>MCS</td>
<td>Welsh NPD KS1 To KS4, Post 16 education</td>
<td></td>
</tr>
</tbody>
</table>

**Coming soon:**

- HES data refresh in Next Steps, BCS70 and NCDS (beyond years 2017)
- Refresh of Welsh health dataset linked to MCS (up to age 14 and parents) UK
- Mental health data in MCS, Next Steps, NCDS, BCS70 (Early 2025)
Ageing data

Transitions
Life-events
Specific focus:
-economic activity, physical health, cognition and mental health data
Health – life-course data
Examples of the type of data collected in the Birth cohorts

<table>
<thead>
<tr>
<th>Pregnancy and birth</th>
<th>Early years, childhood &amp; adolescence</th>
<th>Adulthood</th>
<th>Midlife</th>
<th>Older people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstetric history</td>
<td>Obstetric history</td>
<td>Medical conditions</td>
<td>Diagnosis of medical conditions</td>
<td></td>
</tr>
<tr>
<td>Pregnancy (health during, problems, antenatal care)</td>
<td>Labour (length, pain relief, problems)</td>
<td>Fertility</td>
<td>Medications</td>
<td></td>
</tr>
<tr>
<td>Birthweight, length</td>
<td>Birthweight, length</td>
<td>Menstruation</td>
<td>Gynaecological issues</td>
<td></td>
</tr>
<tr>
<td>Childhood illness</td>
<td>Medical conditions</td>
<td>Pregnancy and health</td>
<td>Physical function</td>
<td></td>
</tr>
<tr>
<td>Disability</td>
<td>Fertility</td>
<td>Mental health</td>
<td>Pain</td>
<td></td>
</tr>
<tr>
<td>Use of health services</td>
<td>Menstruation</td>
<td>Mental health</td>
<td>Mental health</td>
<td></td>
</tr>
<tr>
<td>Immunisation/vaccinations</td>
<td>Pregnancy and health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental health</td>
<td>Health behaviours</td>
<td>Contraceptive/sterilisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Menopause / HRT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mental health</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CENTRE FOR LONGITUDINAL STUDIES
Socio-economic – life-course data
Examples of the type of data collected in the Birth cohorts

- Pregnancy and birth
- Early years, childhood & adolescence
- Adulthood
- Midlife
- Older people

- Where they live
- Housing tenure

- Paternal and maternal occupation
  - Occupation
  - Income
  - Education

- Grandparents’ occupation

- GCSE/O’level
- A’levels
- Life-long learning

- Moves

- Cohort members (& partners’)
  - Occupation / employment status
  - Income

- Children’s
  - Work details
  - Highest qualification
Family and relationships – life-course data
Examples of the type of data collected in the Birth cohorts

<table>
<thead>
<tr>
<th>Pregnancy and birth</th>
<th>Early years, childhood &amp; adolescence</th>
<th>Adulthood</th>
<th>Midlife</th>
<th>Older people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household composition</td>
<td>Relationship to CM</td>
<td>Partnership histories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status / partnership formation -&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends</td>
<td>Family life</td>
<td>Socialising</td>
<td>Sexual behaviour</td>
<td></td>
</tr>
<tr>
<td>Cohabiting and non partner relationship</td>
<td>Partnership changes -&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of relationships</td>
<td>Social support and relationships</td>
<td>Emotional support</td>
<td>Leisure time/activities</td>
<td></td>
</tr>
<tr>
<td>Parents (in laws)</td>
<td>Alive, age of death</td>
<td>Relationship with parents</td>
<td>Residential location</td>
<td>Freq. contact / Care provision</td>
</tr>
<tr>
<td>Children</td>
<td>Number (own, adopted, partners’, absent)</td>
<td>Family activities/role</td>
<td>Marital and parental status</td>
<td>Location</td>
</tr>
<tr>
<td>Grandchildren</td>
<td>Number of Care of</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Economic activity / retirement

Physical health

Cognition

Mental health / well-being
## Economic activity, income and wealth

<table>
<thead>
<tr>
<th>Earnings and Income</th>
<th>NCDS 58</th>
<th>BCS 70</th>
<th>NS 89</th>
<th>MCS 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>11, 16, 23, 33, 42, 46, 50, 55, 62/5</td>
<td>0, 10, 16, 26, 30, 34, 38, 42, 46, 52/3</td>
<td>25, 32</td>
<td>3, 5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Earnings from work</td>
<td>7, 11, 16, 23, 33, 42, 46, 50, 55, 62/5</td>
<td>10, 16, 26, 30, 34, 42, 46, 52/3</td>
<td>14, 15, 16, 20, 25, 32</td>
<td>3, 5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Other income (investments, income support, benefits, etc.)</td>
<td>16, 23, 33, 42, 50, 55, 62/5</td>
<td>10, 30, 34, 42, 52/3</td>
<td>25, 32</td>
<td>3, 5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Wealth (actual):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>55, 62/5</td>
<td>42, 52/3</td>
<td>-</td>
<td>11, 14</td>
</tr>
<tr>
<td>Financial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Investments/Savings</td>
<td>23, 33, 50, 62/65</td>
<td>34, 42, 46, 52/3</td>
<td>32</td>
<td>11, 14</td>
</tr>
<tr>
<td>- Debt</td>
<td>33, 62/5</td>
<td>42, 46, 52/3</td>
<td>25, 32</td>
<td>11, 14</td>
</tr>
<tr>
<td>- Pensions</td>
<td>62/65</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Inheritance received</td>
<td>23, 33, 62/5</td>
<td>42, 52/3</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Transfers given</td>
<td>62/5</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Parents, cohort members
## Overview of health measures

<table>
<thead>
<tr>
<th>Physical health measures</th>
<th>NCDS 58</th>
<th>BCS 70</th>
<th>NS 89</th>
<th>MCS 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self assessed general health</td>
<td>7, 11, 16, 33, 44, 46, 50, 55, 62/5</td>
<td>5, 10, 16, 34, 42, 46, 52/3</td>
<td>25, 32</td>
<td>3, 5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Medical conditions/ *long term illness</td>
<td>0, 7, 11, 26, 23, 33, 42, 44, 46, 50, 55, 62/5</td>
<td>0, 5, 10, 16, 26, 30, 34, 38, 42, 46, 52/3</td>
<td>14*, 15*, 16*, 17*, 18*, 19*, 20*, 25*</td>
<td>9m, 3, 5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Anthropometry</td>
<td>7, 11, 16, 23, 33, 42, 44, 50, 55, 62/5</td>
<td>10, 16, 26, 30, 34, 42, 46, 52/3</td>
<td>25, 32</td>
<td>3, 5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Physical activity (leisure time)</td>
<td>11, 16, 23, 33, 42, 44, 46, 50, 55, 62/5</td>
<td>5, 10, 16, 34, 42, 46, 52/3</td>
<td>20, 25, 32</td>
<td>5, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Diet related measures (intake, overeating)</td>
<td>7, 33, 42, 44, 62/5</td>
<td>10, 16, 30, 34, 42, 46, 52/3</td>
<td>25</td>
<td>9 months, 3, 7, 11, 14, 17</td>
</tr>
<tr>
<td>Smoking, drugs &amp; alcohol consumption</td>
<td>16, 23, 33, 42, 44, 46, 50, 55, 62/5</td>
<td>10, 16, 26, 30, 34, 42, 46, 52/3</td>
<td>14, 15, 16, 17, 18, 19, 20, 25, 32</td>
<td>11, 14, 17</td>
</tr>
<tr>
<td>Sleep</td>
<td>7, 16, 50, 62/5</td>
<td>16, 42, 46, 52/3</td>
<td>25, 32</td>
<td>14, 17</td>
</tr>
<tr>
<td>DNA /biomarkers</td>
<td>44 genetic &amp; bio, 62/5</td>
<td>46 (genotyping &amp; bio)</td>
<td>Planned for age 32</td>
<td>14 (genetic)</td>
</tr>
</tbody>
</table>
## Anthropometrics / physical function

<table>
<thead>
<tr>
<th></th>
<th>NCDS 58</th>
<th>BCS70</th>
<th>Next Steps 89</th>
<th>MCS 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height, Weight and BMI</td>
<td>7, 11**, 16, (23), 33, 44/5, (50), (55), 62/65</td>
<td>5*,10**, 16, (26), (30), (34), (42), 46, (52/53)</td>
<td>(25, 32)</td>
<td>3**,5,7,11,14,17</td>
</tr>
<tr>
<td>Head circumference</td>
<td>7</td>
<td>5,10,16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hip and waist circumference</td>
<td>44/45, 62/65</td>
<td>46</td>
<td></td>
<td>5,7 (waist)</td>
</tr>
<tr>
<td>Body fat</td>
<td></td>
<td>46</td>
<td></td>
<td>7,11,14,17</td>
</tr>
<tr>
<td>Vision</td>
<td>7,11,16, 44/5, 62/5</td>
<td>10, 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audiometry</td>
<td>7,11,16, 44/5</td>
<td>10,16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laterality</td>
<td>7</td>
<td>10,16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-ordination</td>
<td>7,11,16</td>
<td>10,16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech</td>
<td>7,11,16</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td>44/45, 62/65</td>
<td>10, 16, 46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>44/45</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory function (FEV1 and FVC)</td>
<td>44/45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximal grip strength</td>
<td>62/65</td>
<td></td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Leg-raise/balance</td>
<td>62/65</td>
<td></td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Timed normal walking speed</td>
<td>62/65</td>
<td></td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

* Height only ** also parents height and weight () self-report
## Biomarkers in NCDS and BCS70
extracted from blood samples

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>NCDS (44/5)</th>
<th>NCDS (62/5)</th>
<th>BCS70 (46)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total and HDL cholesterol</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>C-reactive protein (CRP)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Glycated haemoglobin (HbA1c)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Insulin-like growth factor 1 (IGF-1)</td>
<td>Y</td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Total and allergen-specific immunoglobulin E</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>House Dust Mite, Cat and Grass Pollen Allergens</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tissue plasminogen activator (t-PA)</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Von Willebrand factor (9vWF)</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum 25-hydroxyvitamin D</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibrin D-dimer</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferritin</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Cytomegalovirus</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
<tr>
<td>Red blood cell count</td>
<td></td>
<td></td>
<td>Y</td>
</tr>
</tbody>
</table>

**NCDS (62/5)**: Metabolomics – metabolic biomarker profiles e.g. fatty acids, apolipoproteins, amino acids, fluid balance, glycolysis related metabolites, inflammation
## Cognitive measures in childhood

<table>
<thead>
<tr>
<th>(Main) cognitive ability/skill</th>
<th>NCDS 58</th>
<th>BCS 70</th>
<th>NS 89</th>
<th>MCS 01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental milestones</td>
<td></td>
<td>22 months*, 42 months*</td>
<td></td>
<td>9 months</td>
</tr>
<tr>
<td>School readiness (BSRA-R)</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Verbal reasoning</td>
<td>11</td>
<td>10</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Non-verbal reasoning</td>
<td>11</td>
<td>10,16</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Verbal skills (i.e. reading, comprehension, vocabulary, literacy)</td>
<td>7,11,16</td>
<td>5,10,16</td>
<td>3,5,7,14</td>
<td></td>
</tr>
<tr>
<td>Mathematics and numeracy</td>
<td>7,11,16</td>
<td>10,16</td>
<td></td>
<td>7,17</td>
</tr>
<tr>
<td>Visual/spatial processing</td>
<td>7</td>
<td>5</td>
<td></td>
<td>5,7</td>
</tr>
<tr>
<td>Decision making</td>
<td></td>
<td></td>
<td>11,14</td>
<td></td>
</tr>
<tr>
<td>Memory (spatial working)</td>
<td>10</td>
<td></td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

* sub-sample
## Cognitive measures in adulthood

<table>
<thead>
<tr>
<th>(Main) cognitive ability/skill</th>
<th>NCDS 58</th>
<th>BCS 70</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verbal skills:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APU Vocabulary test</td>
<td></td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>National Adult Reading Tests (NART)</td>
<td>52/3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Literacy and numeracy</strong></td>
<td>37*</td>
<td>21*,34</td>
<td></td>
</tr>
<tr>
<td><strong>Executive function:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal fluency (animal naming):</td>
<td>50, 62/5</td>
<td>46, 52/3</td>
<td></td>
</tr>
<tr>
<td><strong>Memory:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate and delayed word recall</td>
<td>50, 62/5</td>
<td>46, 52/3</td>
<td>32</td>
</tr>
<tr>
<td>Backward digit span</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processing speed:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timed letter search/cancellation</td>
<td>50, 62/5</td>
<td>46, 52/3</td>
<td></td>
</tr>
</tbody>
</table>

* sub-sample
## Mental health scales in childhood and adolescence only

<table>
<thead>
<tr>
<th>Mental Health measure</th>
<th>NCDS (58)</th>
<th>BCS70</th>
<th>NS (89/90)</th>
<th>MCS (01/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rutter Behaviour Scales</td>
<td>7, 11, 16, 16</td>
<td>5, 10, 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>British Social Adjustment Guide</td>
<td>7, 11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conners Hyperactivity Rating Scale</td>
<td></td>
<td>10, 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Development Scale*</td>
<td></td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaise Inventory: Psychological distress</td>
<td>5, 16, 16</td>
<td></td>
<td></td>
<td>9m</td>
</tr>
<tr>
<td>GHQ-12: Psychological distress</td>
<td>16</td>
<td>14, 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengths and Difficulties Questionnaire (SDQ)</td>
<td></td>
<td></td>
<td>3, 5, 7, 7, 11, 11, 14, 17, 17</td>
<td></td>
</tr>
<tr>
<td>Kessler 6 (K6)</td>
<td></td>
<td></td>
<td>3, 5, 7, 11, 14, 17, 17</td>
<td></td>
</tr>
<tr>
<td>Mood &amp; Feelings Questionnaire (Short)</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

*Parent, teacher, self-report and maternal mental health*

*items from Rutter, Conners and Swansea Assessment Battery*
## Mental health scales in adulthood

<table>
<thead>
<tr>
<th>Mental Health measure</th>
<th>NCDS (58)</th>
<th>BCS70</th>
<th>NS (89/90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaise Inventory: Psychological distress</td>
<td>23, 33, 42, 50, 62/5</td>
<td>16, 26, 30, 34, 42, 46, 52/3</td>
<td></td>
</tr>
<tr>
<td>GHQ-12: Psychological distress</td>
<td>42</td>
<td>30</td>
<td>25, 32</td>
</tr>
<tr>
<td>Kessler (4)</td>
<td></td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>
| 36 Item Short Form Survey (SF-36) – health incl. general mental health
 - Mental Health Inventory (MHI-5)                         | 50                         | 46, 52/3                          |                         |
| Clinical Interview Schedule – Revised (CIS-R)              | 44                         |                                   |                         |
## Well-being scales in the cohorts

<table>
<thead>
<tr>
<th>Well-being measure</th>
<th>NCDS (58)</th>
<th>BCS70</th>
<th>NS (89/90)</th>
<th>MCS (01/2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warwick-Edinburgh Mental Wellbeing Scale (WEMBS)</td>
<td>50, 62/5</td>
<td>42, 46, 52/3</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Life satisfaction</td>
<td>33, 42, 46, 50, 62/5</td>
<td>26, 30, 34, 42, 46, 52/3</td>
<td>20, 25, 32</td>
<td>9m,3, 5, 7,11, 11</td>
</tr>
<tr>
<td>Happiness</td>
<td></td>
<td></td>
<td>32</td>
<td>9m,3, 5, 7,11, 11, 14</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td></td>
<td>10,16¹</td>
<td>14,16²</td>
<td>9m,11,14,17³</td>
</tr>
<tr>
<td>S¹Lawseq</td>
<td>33, 42, 46, 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>²2 items useful/worthless</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>³Shortened Rosenberg Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Life Scale (CASP- 12/6 item)</td>
<td>50, 55, 62/5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loneliness (UCLA)</td>
<td>62/3</td>
<td>52/3</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>
Resources and access to data
Data freely available to researchers, government analysts and third sector workers: https://ukdataservice.ac.uk/
Access to different types of data at the UKDS
Access to data held by the UK Data Service varies depending on how the data is classified:

**Safeguarded data** available under **End User Licence** (EUL): data with a low level of sensitivity and disclosivity.
- Most of our data are available under this licence.
- Your application is authorised directly by the UK Data Service, and you can download the data directly from there.

**Special safeguarded data** available under **Special Licence** (SL): access to moderately sensitive or disclosive data. Access through the UK Data Service and application approved by CLS before you can download the data.

**Controlled data** available under **Secure Access Licence** (SA) for access to the most sensitive and/or potentially disclosive data. Access through the UK Data Service and attend a specialised training course. CLS approval and access via UK Data Service SecureLab

For details on specialist linked administrative data, genetic data and more information on data access please visit: [https://cls.ucl.ac.uk/data-access-training/data-access/](https://cls.ucl.ac.uk/data-access-training/data-access/)
Resources available: CLS website

https://cls.ucl.ac.uk/

1958 National Child Development Study

The 1958 National Child Development Study (NCDS) is following the lives of all 15,000 people born in England, Scotland and Wales in a single week of 1958. It started in 1958 at birth, as the Perinatal Mortality Study.

NCDS sweeps
Since the initial birth sweep, NCDS cohort members have been followed up ten times. We paused the age 60 sweep due to the pandemic but this is now underway once again. Click on any sweep label to learn more about the information collected.

Age | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

BCS70 sweeps
Since the birth survey in 1970 there have been nine "sweeps" of all cohort members. Click on a sweep label to learn more about the information collected. The latest survey, at age 31, is now underway.

Age | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 |

1970 British Cohort Study

The 1970 British Cohort Study (BCS70) is following the lives of all 17,000 people born in England, Scotland and Wales in a single week of 1970.

Millennium Cohort Study

The Millennium Cohort Study (MCS), also known as "Child of the Century," follows 30,000 British 8-11 year olds, following the lives of around 10,000 young people born across England, Scotland, Wales and Northern Ireland in 2000-01. This study began with an original sample of 15,885 cohort members.

On this page: Introduction | Sweeps | COVID-19 survey and data | Latest from MCS | Publications | Study features | Population documentation | Data access | Principal investigator | More related content

Next Steps sweeps
There have been one main BCS70 sweep, including an "intervention" for Education. Click on a sweep label to learn more.

Age | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100

Introduction to the 1958 National Child Development Study.
Introduction to the 1970 British Cohort Study.
Introduction to the Millennium Cohort Study.
Resources available on each cohort and sweeps: User Guide, technical resources and questionnaires
CLS training and support

Upcoming training events

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics and epigenetics data in the British cohort studies</td>
<td>6 March 2024</td>
</tr>
<tr>
<td>Methods: Cross-cohort analyses</td>
<td>June 2024</td>
</tr>
</tbody>
</table>

https://cls.ucl.ac.uk/events/
British birth cohorts
- unique resource in the study of ageing
- types of ageing research that can be done
Healthy ageing through the life course lens

- Long term effects of early life circumstances
- Intergenerational cycles in poverty and in health
- Life course transitions
- Quality of life, functioning and productivity, post the onset of chronic illness
- Reversibility/Resilience
- Changing experiences of different generations
- External shocks (pandemic, cost of living crisis)
UK state pension age will soon need to rise to 71, say experts

Research on life expectancy and birthrates shows that ill health makes status quo unsustainable

'Can't take it much longer': workers too young for UK pension

Pension income needed to retire jumps as family costs rise

CENTRE FOR LONGITUDINAL STUDIES
Reducing bias

- **Causal inference**
  - Availability of life course data to adjust models and make the no omitted variables/residual confounding assumption more plausible
  - Rich life course data to explore for potential negative controls/falsification tests
  - Rich life course data to explore for potential instrumental variables

- **Missing data**
  - Availability of rich life course data to handle missing data due to attrition and restore sample representativeness
Early life determinants of mid-life health mortality

JAMA Psychiatry | Original Investigation

Association of Early-Life Mental Health With Biomarkers in Midlife and Premature Mortality Evidence From the 1958 British Birth Cohort

George B. Ploubidis, PhD; G. David Batty, PhD, DSc; Praveetha Patalay, PhD; David Bann, PhD; Alissa Goodman, MSc
Deaths of despair? Early life mental health trajectories and probability of survival
Long-term psychological distress trajectories and the COVID-19 pandemic in three British birth cohorts: A multi-cohort study

Dario Moreno-Acosto, Helen L. Fisher, Alissa Goodman, Stephani L. Hatch, Craig Morgan, Marcus Richards, Jayali Das-Munshi, George B. Ploubidis

Published: April 4, 2023 • https://doi.org/10.1371/journal.pmed.1004145

Pandemic triggered ‘second midlife crisis’ among over-50s, study finds

Women hit worst by mental health strains, with more domestic and caring duties amid Covid lockdowns

- ‘I struggled to cope’: over-50s in UK describe Covid’s toll on mental health
BCS70 – Housing tenure in adulthood
Men: Working life histories by age 55
Women: Working life histories by age 55

Moulton, V. et al, in progress

- 2013 (Age 55): 76.6%
- 2020 (Age 62): 51.2%
- 2021 (Age 63): 45.9%

- 2013 (Age 55): 76.6% Long term illness
- 2020 (Age 62): 51.2% Long term illness
- 2021 (Age 63): 45.9% Long term illness
GENERATIONAL HEALTH DRIFT

More recently born post-war generations in the UK are experiencing a generational health drift across a wide range of health outcomes.

Baby Boomer
Born in 1940s

Generation X
Born in 1970s

Generation Z
Born in 2000s

CENTRE FOR LONGITUDINAL STUDIES

LESS

Mental health issues

Diabetes

Obesity

Poor self-rated health

Multi-morbidity

MORE

Sources, footnotes, disclaimers etc.
Lifelong Socio Economic Position and biomarkers of later life health: Testing the contribution of competing hypotheses

George B. Ploubidis\textsuperscript{a,b,*}, Lenka Benova\textsuperscript{a}, Emily Grundy\textsuperscript{c}, Daniel Laydon\textsuperscript{d}, Bianca DeStavola\textsuperscript{b}

\textsuperscript{a}Department of Population Health, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, United Kingdom
\textsuperscript{b}Centre for Statistical Methodology, Department of Medical Statistics, Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, United Kingdom
\textsuperscript{c}Department of Geography, University of Cambridge, United Kingdom
\textsuperscript{d}Faculty of Medicine, Imperial College, United Kingdom
Net family income across a working lifetime

- 90th centile
- Median
- 10th centile

Real equivalised weekly income

Net family income across a working lifetime
Please complete the feedback form